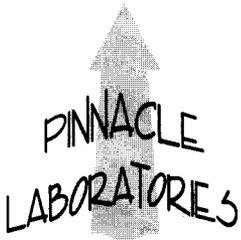


Offsite 2002



2709-D Pan American Freeway NE  
Albuquerque, New Mexico 87107  
Phone (505) 344-3777  
Fax (505) 344-4413

PL I.D. 201122



Offsite White Rock Canyon springs; Spring 4A

July 16, 2002

NMED HWB  
2905 Rodeo Park Drive East  
Bldg. 1  
Santa Fe, NM 87505

Project Name/Number: 4 SERIES SPRING 01.28.02-167 (HWB RED DOT)

Attention: John Young

On **01/29/02**, Pinnacle Laboratories Inc., (ADHS License No. AZ0592 pending), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

This report is being reissued in part to provide additional Tritium data for "SPRING 4A".

Tritium, N15/N14, Oxygen 18 and Deuterium analyses were performed by University of Miami, Miami, FL.

All other analyses were performed by EnviroTest Laboratories, LLC. Casper, WY.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

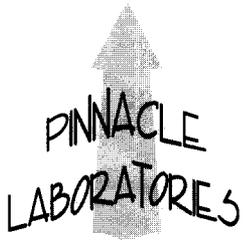
H. Mitchell Rubenstein, Ph.D.  
General Manager

MR:jt

Enclosure



4134



2709-D Pan American Freeway NE  
Albuquerque, New Mexico 87107  
Phone (505) 344-3777  
Fax (505) 344-4413

CLIENT : NMED HWB DATE RECEIVED : 01/29/02  
PROJECT # : 01.28.02-167 (HWB RED DOT)  
PROJECT NAME : 4 SERIES SPRING REPORT DATE : 07/16/02

PL ID: 201122

	PINNACLE ID #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	201122-01	SPRING 4	AQUEOUS	01/28/02
02	201122-02	SPRING 4C	AQUEOUS	01/28/02
03	201122-03	SPRING 4E	AQUEOUS	01/28/02
04	201122-04	SPRING 4B	AQUEOUS	01/28/02
05	201122-05	SPRING 4A	AQUEOUS	01/28/02
06	201122-06	SPRING 4AA	AQUEOUS	01/28/02

---TOTALS---

MATRIX                      #SAMPLES  
AQUEOUS                      6



June 28, 2002

TRITIUM LABORATORY

Data Release #02-018 - Amendment  
Job # 1576

PINNACLE LABORATORIES  
TRITIUM SAMPLES

  
Dr. James D. Happell  
Assistant Research Professor

Distribution:  
Pinnacle Laboratories, Inc.  
Attention: Mitch Rubenstein  
2709-D Pan American Freeway, NE  
Albuquerque, New Mexico 87107

Rosenstiel School of Marine and Atmospheric Science  
Tritium Laboratory  
4600 Rickenbacker Causeway  
Miami, FL 33149-1098  
Phone: (305) 361-4100  
Fax: (305) 361-4112  
email: tritium@rsmas.miami.edu

GENERAL COMMENTS ON TRITIUM RESULTSTritium Scale New Half-life

Tritium concentrations are expressed in TU, where 1 TU indicates a T/H abundance ratio of  $10^{-18}$ . The values refer to the tritium scale recommended by U.S. National Institute of Science and Technology (NIST, formerly NBS), and International Atomic Energy Agency (IAEA). The TU-numbers are based on the NIST tritium water standard #4926E. Age corrections and conversions are made using the recommended half-life of **12.32 years**, i.e., a decay rate of  $\lambda = 5.626\% \text{ year}^{-1}$ . In this scale, 1 TU is equivalent to 7.151 dpm/kg H<sub>2</sub>O, or 3.222 pCi/kg H<sub>2</sub>O, or 0.1192 Bq/kg H<sub>2</sub>O (Bq = disint/sec).

TU values are calculated for date of sample collection, REFDATE in the table, as provided by the submitter. If no such date is available, date of sample arrival at our laboratory is used.

The stated errors, eTU, are one standard deviation (1 sigma) including all conceivable contributions. In the table, QUANT is quantity of sample received, and ELYS is the amount of water taken for electrolytic enrichment. DIR means direct run (no enrichment).

Remark: From 1 Jan 1994 through 31 Dec 2001 we used the previously recommended value for the half-life, 12.43 years. The use of the new number, 12.32 years will in practice increase the reported TU-values by 0.9 %. This is insignificant since our reported values carry 1 sigma uncertainties of 3 % or more.

It is interesting to note that before 1994 we used the older, then recommended value of 12.26 years.

Very low tritium values

In some cases, negative TU values are listed. Such numbers can occur because the net tritium count rate is, in principle the difference between the count rate of the sample and that of a tritium-free sample (background count or blank sample). Given a set of "unknown" samples with no tritium, the distribution of net results should become symmetrical around 0 TU. The negative values are reported as such for the benefit of allowing the user unbiased statistical treatment of sets of the data. For other applications, 0 TU should be used.

Additional information

Refer to Services Rendered (Tritium), Section II.8, in the "Tritium Laboratory Price Schedule; Procedures and Standards; Advice on Sampling", and our Web-site [www.rsmas.edu/groups/tritium](http://www.rsmas.edu/groups/tritium).

Tritium efficiencies and background values are somewhat different in each of the nine counters and values are corrected for cosmic intensity, gas pressure and other parameters. For tritium, the efficiency is typically 1.00 cpm per 100 TU (direct counting). At 50x enrichment, the efficiency is equivalent to 1.00 cpm per 2.4 TU. The background is typically 0.3 cpm, known to about  $\pm 0.02$  cpm. Our reported results include not only the Poisson statistics, but also other experimental uncertainties such as enrichment error, etc.

End

Client: PINNACLE LABORATORIES, INC

Purchase Order: 201122

Recvd : 02/01/31

Contact: M. Rubenstein, 505 344-3777,-4413F

Job# : 1576

2709-D Pan American Fwy, NE

Final : 02/06/26 LABORATORY RERUN

Albuquerque, NM 87107

Cust	LABEL INFO	JOB.SX	REFDATE	QUANT	ELYS	TU	eTU
PINNACLE-	SPRING 4A	1576.05	020128	1000	275	0.25*	0.09

\* Average of multiple runs. This results no different from ORIGINAL.  
No action necessary.

PINNACLE LABORATORIES, INC.

Recvd: 02/01/31

Job#: 1576

Final: 02/06/26 Laboratory Rerun

Purchase Order: 201122

Contact: M. Rubenstein, (505)344-3777, -4413 (F)

2709-D Pan American Fwy.

Albuquerque, NM 87107

CLIENTSID	LABSID	SMPTYP	MATRIX	ANALYTE	REPLIM	RESULT	QUAL	UNITS	SAMPDAT	EXTDAT	ANLYDAT	ANLYGRP	ANLYMETH	RCVDDAT	LAB CODE	SMP WTVOL	QCBATCH	2 SIGMA ERROR	REP RESULT
PINNACLE - Spring 4	1576.01	UNK	WATER	<sup>3</sup> H	0.1 TU	3.52		TU	02/01/28	02/02/04	02/02/14	ISOTOPE	ENR/GPC	02/01/31		275	BEND 10,11	0.22	
PINNACLE - Spring 4C	1576.02	UNK	WATER	<sup>3</sup> H	0.1 TU	3.60		TU	02/01/28	02/02/04	02/02/21	ISOTOPE	ENR/GPC	02/01/31		275	BEND 12	0.24	
PINNACLE - Spring 4E	1576.03	UNK	WATER	<sup>3</sup> H	0.1 TU	3.52		TU	02/01/28	02/02/04	02/02/14	ISOTOPE	ENR/GPC	02/01/31		275	BEND 10,11	0.24	
PINNACLE - Spring 4E	1576.03	UNK	WATER	<sup>3</sup> H	0.1 TU	3.76	2R	TU	02/01/28	02/02/14	02/02/25	ISOTOPE	ENR/GPC	02/01/31		260	BEND 14	0.24	
PINNACLE - Spring 4B	1576.04	UNK	WATER	<sup>3</sup> H	0.1 TU	15.17		TU	02/01/28	02/02/05	02/02/21	ISOTOPE	ENR/GPC	02/01/31		275	BEND 12	0.68	
PINNACLE - Spring 4A	1576.05	UNK	WATER	<sup>3</sup> H	0.1 TU	0.29		TU	02/01/28	02/02/05	02/02/14	ISOTOPE	ENR/GPC	02/01/31		275	BEND 10,11	0.20	
PINNACLE - Spring 4A	1576.05	UNK	WATER	<sup>3</sup> H	0.1 TU	0.06	2R, RIP	TU	02/01/28	02/02/15	02/02/25	ISOTOPE	ENR/GPC	02/01/31		275	BEND 14	0.20	
<b>PINNACLE - Spring 4A</b>	<b>1576.05</b>	<b>UNK</b>	<b>WATER</b>	<b><sup>3</sup>H</b>	<b>0.1 TU</b>	<b>0.25</b>	<b>3R</b>	<b>TU</b>	<b>02/01/28</b>	<b>02/05/16</b>	<b>02/05/28</b>	<b>ISOTOPE</b>	<b>ENR/GPC</b>	<b>02/01/31</b>		<b>275</b>	<b>BEND 40</b>	<b>0.18</b>	
PINNACLE - Spring 4AA	1576.06	UNK	WATER	<sup>3</sup> H	0.1 TU	1.06		TU	02/01/28	02/02/05	02/02/21	ISOTOPE	ENR/GPC	02/01/31		275	BEND 12	0.20	
PINNACLE - Spring 4AA	1576.06	UNK	WATER	<sup>3</sup> H	0.1 TU	1.03	2R	TU	02/01/28	02/02/22	02/03/04	ISOTOPE	ENR/GPC	02/01/31		250	BEND 16	0.20	
Batch BLANK	BEND 10	BLANK	WATER	<sup>3</sup> H	0.1 TU	-0.02	G	TU	N/A	02/01/30	02/02/12	ISOTOPE	ENR/GPC	N/A	BEND	275	N/A	0.06	
Batch BLANK	BEND 11	BLANK	WATER	<sup>3</sup> H	0.1 TU	-0.02	G	TU	N/A	02/02/05	02/02/18	ISOTOPE	ENR/GPC	N/A	BEND	268	N/A	0.08	
Batch BLANK	BEND 12	BLANK	WATER	<sup>3</sup> H	0.1 TU	-0.05	G	TU	N/A	02/02/07	02/02/19	ISOTOPE	ENR/GPC	N/A	BEND	275	N/A	0.14	
Batch BLANK	BEND 14	BLANK	WATER	<sup>3</sup> H	0.1 TU	0.03	G	TU	N/A	02/02/14	02/02/25	ISOTOPE	ENR/GPC	N/A	BEND	275	N/A	0.12	
Batch BLANK	BEND 16	BLANK	WATER	<sup>3</sup> H	0.1 TU	0.03	G	TU	N/A	02/02/20	02/03/04	ISOTOPE	ENR/GPC	N/A	BEND	250	N/A	0.10	
<b>Batch BLANK</b>	<b>BEND 40</b>	<b>BLANK</b>	<b>WATER</b>	<b><sup>3</sup>H</b>	<b>0.1 TU</b>	<b>0.08</b>	<b>G</b>	<b>TU</b>	<b>N/A</b>	<b>02/05/17</b>	<b>02/05/28</b>	<b>ISOTOPE</b>	<b>ENR/GPC</b>	<b>N/A</b>	<b>BEND</b>	<b>275</b>	<b>N/A</b>	<b>0.04</b>	
Batch CHECK STANDARD*	NBS1058	STD	WATER	<sup>3</sup> H		24,762	G	TU	N/A	N/A	02/02/21	ISOTOPE	DIR/GPC	N/A	NBS	N/A	NBS	220	
Batch CHECK STANDARD*	NBS2050	STD	WATER	<sup>3</sup> H		24,779	G	TU	N/A	N/A	02/02/15	ISOTOPE	DIR/GPC	N/A	NBS	N/A	NBS	200	
Batch CHECK STANDARD*	NBS5066	STD	WATER	<sup>3</sup> H		24,801	G	TU	N/A	N/A	02/02/26	ISOTOPE	DIR/GPC	N/A	NBS	N/A	NBS	200	
Batch CHECK STANDARD*	NBS5075	STD	WATER	<sup>3</sup> H		24,733	G	TU	N/A	N/A	02/03/06	ISOTOPE	DIR/GPC	N/A	NBS	N/A	NBS	238	
<b>Batch CHECK STANDARD*</b>	<b>NBS4157</b>	<b>STD</b>	<b>WATER</b>	<b><sup>3</sup>H</b>		<b>24,271</b>	<b>G</b>	<b>TU</b>	<b>N/A</b>	<b>N/A</b>	<b>02/05/31</b>	<b>ISOTOPE</b>	<b>DIR/GPC</b>	<b>N/A</b>	<b>NBS</b>	<b>N/A</b>	<b>NBS</b>	<b>240</b>	
*The value of the standard, SRM 4926E, provided by NIST:																			
age-corrected to COUNTDT (= ANLYDAT) of 02/02/21, is 24,694.																			
age-corrected to COUNTDT (= ANLYDAT) of 02/05/31, is 24,320.																			
Abbreviations for quality evaluation, Col. G:																			
G: good; LC: lab check; 2R: 2nd run; 3R: 3rd run; RIP: rerun in progress, H: high; PQ: poor quality																			